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AUTHOR Salminen, Jaakko
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ABSTRACT

Twenty-nine kindergarten children judged to have weak or inadequate psychomotor abilities affecting their acquisition of written language participated in a psychomotor training program. The program used rhythmic, optic, phonemic, kinesthetic, and melodic exercises to attempt to facilitate the children's language acquisition and thus to improve their reading and writing abilities. After three months, the achievement level of the children had risen in all components in comparison with that of children in a control group, with the greatest differences from the control group occurring in kinesthetic and melodic differentiation. It was found that the psychomotor tests were good predictors of pupils' school achievement in reading and writing. The effects of the psychomotor training could still be seen two years later. (TJ)

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Jaakko Salminen
Associate professor
University of Joensuu
80100 Joensuu 10
Finland

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THE IMPORTANCE OF PSYCHOMOTOR TRAINING FOR LANGUAGE ACQUISITION

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Theoretical Foundations

Research on learning and teaching to read has increased considerably in recent years. One of the reasons for this is the fact that an increasing demand for functional reading ability has been established in recent studies on reading and writing difficulties. Nowadays the average man has to be able to read more and more complex texts in order to cope with the demand of society. He is to understand what he reads better and more precisely than a few years ago.

If children are not taught to read so that their reading ability will meet the demand of society, they will need interpreters to explain the main points of written information to them. This, inturn, will divide people into two groups: those who read information and those whom it has to be interpreted. The latter group will suffer from their inadequate reading ability already at school, for text

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books require precise reading with understanding at relatively early stage. In addition, reading difficulties at school can easily cause secondary symptoms, such as emotional disturbances and difficulties in adjustment, that are harmful to the child's general development.

According to Schiffman's study (2) the rehabilitation of children with difficulties in reading and writing succeed in 82 per cent of the cases, provided that the reading difficulty is diagnosed during the second school year at the latest. The corresponding percentage is only 15, if the difficulty is diagnosed during the fifth school year. It seems probable that a 100-per-cent succes will never be reached, whatever the means and whoever the teacher might be. But the result may well exceed 82 per cent, if the difficulties can be anticipated and the child trained in those abilities required for learning to read that have not developed adequately.

Breuer and Weuffen, GDR (1) have analysed the readiness factors the child needs in learning to read and write. They have discovered five factors, which they call the sensorimotor abilities of verbal learning. These readiness factors are of crucial importance to verbal learning in school, at least during the first school years. Based on the analysis, they have constructed a differntiation test (Differenzierungsprobe), which makes it possible to find the six-year-olds whose readiness factors have not developed adequately and who, consequently, will have difficulties in verbal learning.

For my own research (6) I have constructed a Finnish version of the Breuer-Weuffen Differentiation Test. I use the term psychomotor differentiation test, instead of sensorimotor, so as to avoid confusion with Piaget's sensorimotor period. Psychomotor skills are those requiring cooperation between mind and muscle in an individual. Psychomotor skills are usually a combination of skills in selecting the correct response to a situation followed by skills in making that response.
Sensorimotor skills are those depending on connection between sensory and motor system of the body. Consequently the concept psychomotor skills can be considered to include also sensorimotor skills.

According to Breuer and Weuffen, the psychomotor skills which are necessary for learning to read and write are:

1. Optic differentiation: the ability to perceive and differentiate precisely optically perceivable forms.
2. Phonemic differentiation: the ability to differentiate precisely details, sounds, sound quantity etc. in hearing and to understand meanings of spoken words.
3. Kinaesthetic differentiation: the ability to master and control movements of the speech organs.
4. Rhythmic differentation: the ability to differentiate precisely the rhythmic elements of language and to understand their semantic importance.
5. Melodic differentiation: the ability to differentiate the melodic elements of language and to understand their semantic importance.

These psychomotor abilities serve as the basis of the realization and automatization of the basic elements of language development into speaking, listening, reading, and writing. Without these abilities the child does not learn to speak properly nor to understand speech. In every-day communication the semantic component of speech is in the foreground. The psychomotor skills, associated with language acquisition, and semantics are closely related. The final automatization of verbal activities takes place at pre-school age (5 - 6 years). The prerequisite for learning to read and write exist at this stage (1, 3, 5). The child has also to acquire a completely new attitude to language at that time. Up till now he has only dealt with spoken language; now he has to learn to cope also with written language. He has orientated himself only to the content of linguistic utterance, with the introduction of written language also the form becomes important. His awareness of symbols reaches a completely new level.

The optic differentiation ability becomes more important with written language. Until now it has only supplemented and facilitated the phonemic differentiation. In reading information is conveyed through optic stimuli. Several studies have, however, demonstrated that the ability to receive optic information has developed sufficiently to enable the child to learn to read by the beginning stage of school (1, 3). Therefore the optic differentiation ability alone is, by no means, crucial in language acquisition.

Phonemic differentiation ability and kinaesthesis are also closely connected with each other. The acoustic system of language rests on articulation. Clear articulation is needed in producing linguistic utterances. If the child's kinaesthetic differentiation ability is weak, he will not be able to perform accurately the muscular movements necessary for articulation, nor will he be able to coordinate the simultaneous movements of several muscles (4). Weakness in kinaesthetic differentiation causes the child difficulties in repeating words when spoken to him. In speaking he may leave out phonemes or phonemes may change places or be substituted. At a later stage the above errors will occur in his writing. Phonemic differentiation ability directs and controls kinaesthetic perception of movements. The rhythm and the melody of speech inform the child about speech sequencies and the emotional background of speech. The differentiation of rhythm and melody enables him to know when the speaker has finished his utterance. Rhythm and melody also help him to understand the deepest meaning of an utterance, whether a command, a request, a wish etc. is in question. The ability to understand the meaning involved in the rhythm and the melody of language differentiates between people better than the ability to understand the syntactic structure and overt meanings of language. Therefore it is important to teach these abilities, which are so important in language acquisition, to children. Rhythmic and melodic differentiation should be trained especially in those cases where distinct weaknesses have been discovered.

The ability to perceive the prosodic features of language has, with regard to language acquisition, developed adequately by the time the child begins school (at the age of seven in Finland). The teacher, however, should be able to identify those children who have weaknesses in this respect.

In my own research I have demonstrated the importance of the psychomotor activities, mentioned above, in language acquisition, especialy in learning to read and write and, consequently, in all verbal learning (6).

The psychomotor abilities listed by Breuer and Weuffen are relatively easy to measure. And if a child has weaknesses in three or more

of the five abilities, he will have difficulties in acquiring written language, in reading and writing.

A Research

In my investigation, which included 149 kindergarten children, I discovered that 39 per cent of them had weak or inadequate psychomotor abilities as regards the acquisition of written language. The research was carried out in autumn, a year before the children started school.

An experimental group and a control group were formed out of those children who had weak abilities in order to find out, to what extent a training programme, which was constructed according to the differentiation test, could facilitate the child's language acquisition and thus improve his abilities to learn to read and write.

The training programme consisted of 50 teaching situations, which were carried out in kindergartens. Teaching was done by kindergarten teachers, whose work was directed through consultation. Special attention was paid to those components where the major defects and weaknesses had been found. The psychomotor training lasted for three months altogether.

In the optic exercises the purpose was to direct the child's attention to the stimulus as a whole and to the parts as its defining factors. The optic exercises included perceiving form, quantity, space and direction as well as training the coordination of hand and eye movements. They included both analysis and synthesis. The phonemic exercises were designed to help the child to improve discrimination in listening and to concentrate on listening in general. The exercises also contained training in listening to the initial and final sounds of words.

The purpose of the kinaesthetic exercises was to direct the child's attention to the functioning and movements of articulation organs. The exercises included training in perceiving the functions of the lips, the cheeks and the tongue as well as speech-motor exercises.

The rhythmic exercises tended to teach the child to listen to and to experience physically various rhythms. The melodic exercises were closely related to the rhythmic ones. As songs and singing games are traditionally practised in kindergartens, it was decided to include, as a new and different rhythmic and melodic exercise, observation of speech rhythm and melody as well as giving rhythm to speech by clapping hands and by various sound effects.

Results of the Experiment

Post-tests were carried out after the training programme. As the groups had been matched the differences revealed by the post-test can mainly be taken as resulting from the training. After the three months' training period it was found that the achievement level of the children in the experimental group had risen in all the components. The differences were greatest, in favour of the experimental group, in kinaesthetic and melodic differentiation abilities. On the same basis, I constructed a differentiation test for the first-graders to measure the psychomotor abilities relevant to learning to read and write. Its structure was similar to the test of the six-year-olds. Correlation between the items of the two tests was high. The results given by these tests were compared with teacher evaluations at the end of the second school year and it was found that the tests were good predictors of the pupil's school achievement in reading and writing. The research showed that the psychomotor training produced results already after a three months' training period. The results were relatively permanent and their affects could still be seen two years later, at the end of the second school year.

Summary

Language acquisition is highly dependent on children's training in language use. It is probable that the decisive period for verbal training is before school. Language acquisition process is to be analysed so that it will become clear, which abilities the child

must have to be able to acquire spoken language adequately and to change over to the acquisition of written language.

The training provided before school is to be directed to the psychomotor skills that are relevant to learning to read and write. In my opinion the training is to be carried out by competent kindergarten teachers or preschool teachers.

The training programme is to be implemented in a positive atmosphere. The child must be guided towards correct solutions without paying too much attention to erraneous performances. As training presupposes much repetition, it is necessary to try to avoid boredom, which may result in a negative attitude towards verbal training in general.

Even though the training is based on the differentiation test, which reveals the weak or deficient abilities, it does not mean that the training is limited only to the weak areas. Psychomotor abilities are intervowen in so complex a manner that a training programme, which is carried out properly, will take care of every component. Only exceptional deviations in one of the components can justify an extra emphasis on that component.

The training programme must be carried out before school, the optimal age being probably between 5 and 6. Many scholars call this age the critical period for language acquisition, which deserves to be utilized in facilitating language acquisition process.

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